648.43120CC2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants: MAKINO et al

Serial No.: 10/812,086

Filed: March 30, 2004

For: Vacuum Processing Apparatus

Group: 1763

Examiner: K. Moore

APPELLANTS' BRIEF

Mail Stop: Patent Appeals (Fee)
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

August 7, 2006

Sir:

This Appeal Brief is being submitted under 37 CFR 41.37 in connection with the appeal of the above-identified application, a Notice of Appeal having been filed on June 5, 2006 in an Amendment After Final Action submitted n such date.

REAL PARTY IN INTEREST

The real party in interest is Hitachi High-Technologies Corporation of Japan.

RELATED APPEALS AND INTERFERENCES

This appeal involves an application which is a continuation of parent US Application Serial No. 10/656,334, and another appeal is being presented in

connection with another continuation application, which is US Application Serial No. 10/812,087, of the same parent application Serial No. 10/656,334.

STATUS OF CLAIMS

Claims 1 - 11 have been canceled leaving claims 12 - 23 pending in this application. All of the claims, i.e., claims 12 - 23 stand finally rejected, and are on appeal. A copy of claims 12 - 23, which are on appeal, appear in the appendix hereto.

STATUS OF AMENDMENTS

An Amendment After Final Action in response to the Final Rejection dated January 4, 2006 was submitted on June 5, 2006, wherein the dependency of claims 19, 20 and 21 were amended to overcome a rejection of claims 19 - 22 under 35 USC 112, second paragraph, as being indefinite. In the Advisory Action, it was indicated that for purposes of appeal, the proposed amendments will be entered. Accordingly, claims, as amended, appear in the appendix.

SUMMARY OF THE INVENTION

The present invention relates to a vacuum processing apparatus, and in particular, to the structural arrangement of parts thereof.

Referring to Figs. 1 and 2 of the drawings of this application, as illustrated in Fig. 1(a) the vacuum processing apparatus 100 is divided essentially into two blocks 101 and 102, wherein the front side of the vacuum processing apparatus 100 is an atmospheric block 101, in which a wafer supplied to the apparatus is transferred to a chamber decompressed under atmospheric pressure, and supplied to a processing chamber, whereas the rear side of the apparatus 100 is

composed of a processing block 102 and comprises processing units 103 and 104 having processing chambers being decompressed for processing wafers, a transfer unit 105 for transferring wafers to these processing chambers under reduced pressure, and plural lock chamber units 113 for connecting the transfer unit 105 with the atmospheric block 101, these units capable of being decompressed and maintained at a high degree of vacuum, so that the processing block 102 is a vacuum block, which features are described in the paragraph bridging pages 9 and 10 of the specification.

Turning to independent claims 12 and 13, the only independent claims in this application, both of these claims recite the feature of a transfer box 108, as illustrated in Figs. 1 and 2, inside of which an object wafer to be processed is transferred under an atmospheric condition by a transfer robot (not shown) disposed therein, with the transfer box 108 having a plurality of wafer cassettes 109, 110, installed at a front surface portion thereof, as described in the first full paragraph at page 10 of the specification. The wafer cassettes 109, stores wafers for processing or cleaning, and a dummy cassette 110 stores dummy wafers, wherein the transfer robot transfers wafers stored in these cassettes 109, 110 to the transfer unit 105, which includes a vacuum transfer chamber 112, through a lock chamber 113. Claims 12 and 13 also recite the feature of a vacuum transfer chamber 112 disposed at a rear surface portion of the transfer box 108, and detachably connected thereto. As illustrated in Figs. 1 and 2 of the drawings of this application, the vacuum transfer chamber 112 has a transfer robot (not shown) therein, is disposed at a rear surface portion of the transfer

box 108 and is detachably connected thereto by way of lock chambers 113, for example. As described at page 11, lines 3 - 6 of the specification, the transfer unit is equipped with a transfer chamber 112 capable of being decompressed to a high degree of vacuum and maintaining the vacuum state, and to which processing units 103 and 104 are detachably connected. Additionally, as shown in Figs. 1 and 2, and as recited in claims 12 and 13, at least one vacuum processing chamber, which is provided in the vacuum block 102, in the form of a vacuum processing chambers 103 or 104, is disposed at a rear or side of the vacuum transfer chamber 112, as more clearly illustrated in Fig. 2(a), and is connected thereto, with the vacuum processing chamber 103 or 104 being supplied with gas and enabling processing of the object wafer which is transferred under the vacuum condition by a plasma generated therein, as described at pages 15 - 19 of the specification. As described in the first full paragraph at page 13 of the specification, each of the processing units 103 and 104 can be conceptually divided into upper and lower areas, wherein the upper area is a chamber portion of the processing chamber and the lower area is a bed portion or frame 106, as shown in Fig. 2(b) storing utilities corresponding to the specific processing chamber. Also, as illustrated in Fig. 3, and described in the first full paragraph of page 20 of the specification, a control unit 107 is disposed between the units 103 and 104 for controlling the supply of utilities to the processing unit. Claim 13 recites the feature of an atmospheric block 101 and a vacuum processing clock 102.

As recited in independent claims 12 and 13, a plurality of connector

portions of utility paths, which are for the vacuum processing chambers, are disposed substantially linearly under a connecting portion of the transfer box and the transfer chamber 112, and are disposed at the rear surface portion of the transfer box 108, as more clearly illustrated in Fig. 2(b) of the drawings. As illustrated in the figure, a substantially straight line path extends from the rear surface portion of the transfer box 108 under the connecting portion of the transfer box 108 and the vacuum transfer chamber 112, as represented by at least a part of the connection interface unit 201 under the lock chamber 113 as illustrated in Fig. 2(b). Claims 12 and 13 also recite the feature that the utility paths enable supply of utilities including the gas supplied from the building having a vacuum processing apparatus installed therein to the vacuum transfer chamber or the vacuum processing chamber and enables discharge of exhaust from the vacuum transfer chamber or the vacuum processing chamber including the utility supplied thereto. As described in the first full paragraph at page 15 of the specification, and the rear side of the atmospheric block 101 in the space interposed between the processing block 102 are disposed lock chambers 113 and a gap is formed between the rear side and the frame 106 or between each bed. "The rear side surface of the atmospheric block 101 is used as a supply rout or supplying gas, refrigerant, power, etc. to the processing block". When plural apparatuses are to be disposed, generally the sources for various gases, refrigerants and power to be supplied to the apparatus bodies 100 are disposed on a different floor from where the apparatuses are installed, and fed to each apparatus via pipes. "In the present embodiment, a connection interface 201 for

connecting supplying lines such as pipes for gases and refrigerants from separate locations are lines from the power sources is disposed on the rear side portion of the atmospheric block. In other words, a connector portion between the vacuum processing apparatus and the building in which the apparatus is installed for supplying from the building utilities such as gas, water and air to the apparatus and discharging exhaust from the apparatus is disposed substantially linearly under an entry port for transferring the wafer into vacuum." (emphasis added).

As described in the paragraph bridging pages 15 and 16 of the specification, the supply routes for various utilities are connected via the connection interface unit 201 to the supply path and extend to the processing block 102. That is, "the supply lines of pipes and power lines extending from the connection interface unit 201, pass below the lock chamber unit 113 and below the center area of the transfer chamber 112, and via an interface unit disposed on the frame 106, and connected to each of the beds." (emphasis added). The first full paragraph at page 16 of the specification describes prior art arrangements and disadvantages thereof, wherein, as described in the paragraph bridging pages 16 and 17 and subsequent paragraphs, according to the present embodiment, the prior art problems are solved, in which sufficient work space is secured, operation status is easily confirmed and the footprint of the apparatus is cut down, as described in the paragraph bridging pages 17 and 18 through the first paragraph at page 19 of the specification, according to the present embodiment, the supply lines for supplying utilities required in units of

the processing block 102 are disposed collectively, and, by disposing the power lines and pipes extended from a different floor, such as one floor below the floor in which the apparatus is installed, on the rear surface of the box 108 collectively, the work related to the attaching, connecting and removing of supply lines during installations of the apparatus body 100, maintenance operations of the apparatus or the replacement of equipment is facilitated, and the work efficiency is thereby improved. As further described, the supply lines such as power lines and pipes from the connection interface unit 201 is extended below the lock chamber 113 and the center area of the transfer chamber 112, and via an interface unit disposed on the frame 106 to each bed, and a supplied path 203 from the connection interface unit 201 is disposed so as to extend from the rear side of the atmospheric block 101 and below the lock chamber unit 113 and the transfer chamber 112. Especially, the supply path 203 is collectively passed through the space formed between the beds under the transfer chamber 112 and connected to each bed or frame 106 whereby the space for mounting, connecting or disconnecting the supply path 203 can be secured, the work related thereto is facilitated and the work efficiency improved, so as a result, the overall efficiency of the apparatus is improved and the space required for working on the connection portions is minimized, the footprint of the apparatus system is reduced compared to the case in which supply lines and connectors are disposed around the apparatus, and the number of apparatuses that can be installed in one unit floor area is increased.

As to the dependent claims 14 - 23, such dependent claims recite further

features of the present invention, generally as discussed above. For example, claims 14 and 19 recite the features that the utilities include plural kinds of gases, water, air supplied from the building. Such features are described in the first full paragraph at page 15 of the specification, for example. Claims 15 and 20 recite the feature that the connector portions of the utility paths connect with paths arranged under a floor of the building in which the vacuum processing apparatus is installed, as described in the first full paragraph at page 15 of the specification. Claims 16, 17 and 21, 22 recite the feature that the connector portions of the utility paths are disposed under at least one load lock chamber consisting of the connecting portion between the transfer box and the vacuum transfer chamber, which is described in the second full paragraph at page 18 of the specification. Furthermore, claims 18 and 23 recite the feature of display units disposed at the rear surface portion of the transfer box and enable display of the status of the utility, which is described in the paragraph bridging pages 16 and 17 of the specification and illustrated in Figs. 2(a) and 2(b), for example. That is, as described, on the rear side of the box 108, is disposed a display unit 202 comprising a sensor for detecting the status of each supply line connected to the connection interface 201 and extending toward the processing block 102, and display means for displaying the result of sensor output so the user can confirm the operation status of the apparatus easily.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 12 - 14 and 17 stand rejected under 35 USC 103(a) as being unpatentable over US Patent No. 6,312,525 to Bright et al, in view of US Patent

No. 4,852,516 to Rubin et al. Claims 15 and 16 stand rejected under 35 USC 103(a) as being unpatentable over Bright et al and Rubin et al, further in view of US Patent No. 6,649,019 to Bernard et al, and claims 18 and 23 stand rejected under 35 USC 103 as being unpatentable over Bright et al and Rubin et al, further in view of US Patent No. 5,855,681 to Maydan et al.

ARGUMENTS

In applying Bright et al to the claimed invention, appellants submit that the Examiner mischaracterizes the disclosure of Bright et al in relation to the features of independent claims 12 and 13. More particularly, the Examiner's contention that "Bright et al disclose a vacuum processing apparatus substantially as claimed ..." (emphasis added) is improper. However, the Examiner recognizes that "Bright et al do not explicitly teach the plurality of connector portions of utility paths being disposed substantially linearly under a connection portion of the transfer box and the vacuum transfer chamber, and being disposed at the rear surface portion of the transfer box nor does Bright et al explicitly teach that any of the gases are supplied from the building having the vacuum processing apparatus installed therein (i.e., the same building in which the processing apparatus is installed)". (emphasis added).

Appellants note that Fig. 1 of Bright et al shows a top schematic view of a vacuum system in accordance with the disclosure and teachings of Bright et al, wherein what may be considered a transfer box 300 is provided on the atmospheric side and is connected by way of load lock chambers 16 to a vacuum transfer chamber 12 having vacuum processing apparatuses 14

arranged at the side and rear thereof on the vacuum side. Figures 2 - 4 of Bright et al show a transfer chamber module platform, wherein as shown in Fig. 4, a facilities panel 48 is provided at the side of the platform 26, wherein facility conduits 46 connect to the facilities panel box 48 in order to receive facilities from the manufacturing plant or fabrication facility, as described in column 6, lines 27 - 46. As described, various types of connections 50, 52, 54 and 56 are provided on the side of the facilities panel 48. Thus, appellants submit that while Bright et al discloses a plurality of connection portions, as represented by the facility panel 48, it is readily apparent that Bright et al does not disclose or teach in the sense of 35 USC 103 "a plurality of connector portions of utility paths being disposed substantially linearly under a connection portion of the transfer box and the vacuum transfer chamber, and being disposed at the rear surface of the transfer box" (emphasis added), as recited in independent claims 12 and 13. As is evident from the disclosure of Bright et al, in relation to the facilities panel 48, which is mounted at a side of the platform 26 of the transfer module 12 thereof, such facilities panel 48, if considered to be a connector portion of utility paths is not disposed substantially linearly under a connecting portion of the transfer box 300 and the vacuum transfer chamber 112 of Bright et al, nor is the facilities panel 48 disposed at the rear surface portion of the transfer box 300. Thus, Bright et al does not disclose or teach the structural arrangement as recited in claims 12 and 13 in the sense of 35 USC 103, and Bright et al does not provide the efficient utilization of work space, wherein the space required for working on the connecting portions is minimized, and the footprint of the

apparatus system is reduced. Accordingly, appellants submit that claims 12 and 13 and the dependent claims patentably distinguish over Bright et al in the sense of 35 USC 103.

The Examiner, at least recognizing some deficiencies of Bright et al with regard to the claimed features of independent claims 12 and 13 and the dependent claims, contends that such deficiencies are overcome by Rubin et al. The Examiner indicates that "Rubin et al disclose providing a plurality of detachable modular processing chambers (Figs. 1 - 2 and 7, 100) that form a multi-chamber processing apparatus each with connections (174) to serve as facilities below the individual processing chambers and supplied from a building having the processing chambers installed therein (via a conduit 172), for the purpose of providing a unique and flexible base for a future expansion and change, as well as providing each of the modular processing chambers as an independent, self-contained unit ..." (emphasis added). The Examiner further contends that it would be obvious to combine Bright et al and Rubin et al in order to provide the claimed features. Appellants submit that the Examiner has engaged in a hindsight reconstruction attempt, in complete disregard of the teachings of the individual references, utilizing the principle of "obvious to try" which is not the standard of 35 USC 103.

At the outset, applicants note that Rubin et al issued in 1989, and specifically discloses that the individual modular apparatus 100 includes a processing module 176 at the top portion thereof, and the apparatus 100 is positioned over the docking sub-assembly 104, and enables simultaneous

interconnection of all surface facilities by "engagement of the connectors 174 on the chassis docking plate 114 with those on the sub-assembly docking plate 158" (column 7, lines 2 - 7). Thus, the specific disclosure of Rubin et al is that connecting portions for various utilities is obtained in a vertical path from below the processing module 176 to the processing module. Appellants submit that this structure is disclosed in the Rubin et al patent which issued in 1989. On the other hand, Bright et al, which is based upon a provisional application filed in 1997, some ten years later, and may be considered to have been fully aware of the disclosure of Rubin et al, specifically provides that a facilities panel 48 is located at the side of the platform 26, which supports a transfer chamber 12 to which processing modules are connected. Appellants submit that Bright et al specifically discloses a different structure for connection than that disclosed by Rubin et al. Thus, appellants submit that irrespective of the Examiner's contentions concerning Rubin et al, the combination of Rubin et al with Bright et al is improper, and fails to provide the claimed features in the sense of 35 USC 103.

Furthermore, with respect to Rubin et al, irrespective of the Examiner's contention that Rubin et al may be provided below any chamber and that "each of the connecting openings in Rubin et al is provided over substantially the entire area of the apparatus (see Figs. 3 and 5), and thus would be disposed at a rear surface of a chamber (e.g., transfer box) where rear is interpreted to mean side facing another downstream chamber, where rear surface is interpreted to mean below or underneath the chamber, the connector portions provided in Rubin et al

also meet this interpretation (see Figs. 1 and 2)", (emphasis added), it is apparent that the Examiner utilizes any interpretation considered necessary in an attempt to meet claim limitations. However, it is readily apparent that Rubin et al, like Bright et al provides no disclosure or teaching of the recited features of independent claims 12 and 13 of a vacuum transfer chamber disposed at a rear surface portion of the transfer box and detachably connected thereto, the vacuum transfer unit enabling transfer of the object therein under a vacuum condition (emphasis added) and "a plurality of connector portions of utility paths being disposed substantially linearly under a connecting portion of the transfer box and the vacuum transfer chamber and being disposed at the rear surface portion of the transfer box" (emphasis added), as described in the specification of this application, and which ensure work efficiency and ease of maintenance and repair, which features are contrary to that disclosed and taught by Bright et al and Rubin et al, taken alone or in any combination thereof. Thus, appellants submit that the independent claims 12 and 13 patentably distinguish over the combination of Bright et al and Rubin et al in the sense of 35 USC 103 and should be considered allowable thereover.

As to the dependent claims, the dependent claims which incorporate the features of the parent independent claims patentably distinguish over the combination of Bright et al and Rubin et al as discussed above. More particularly, dependent claims 14 and 17, further define the types of utilities which are arranged in the substantially linear utility paths under a connection portion of the transfer box as the vacuum transfer chamber, as recited in the

independent claims, which features are not disclosed or taught in the cited art.

As to the further combination of Bright et and Rubin et al with Bernard or Maydan et al with respect to other dependent claims, it is readily apparent that Bernard and Maydan et al fail to overcome the deficiencies of Bright et al and Rubin et al in the sense of 35 USC 103. More particularly, with respect to the contention by the Examiner that Maydan et al in column 21, rows 21 - 19, discloses providing display units at various locations, applicants note that column 21, lines 5 - 10 of Maydan et al indicates that "The interface between a user and the system controller is preferably a CRT monitor and light pen which is depicted in Fig. 8. In a preferred embodiment, two monitors are used, one monitor mounted in a clean room wall for the operators and the other monitor behind the wall for the service technicians". Irrespective of the such disclosure by Maydan et al, appellants submit that Maydan et al provides no disclosure or teaching of "display units disposed at the rear surface portion of the transfer box and enable display of the status of the utility" as recited in dependent claims 18 and 23, for example. Thus, the Examiner's contention that the display unit may be provided at any place does not relate to the claimed features of claims 18 and 23, and again represents a hindsight reconstruction attempt utilizing the principle of "obvious to try" which is not the standard of 35 USC 103.

As to dependent claims 16, 17 and 20, 21, such claims recite the features of "the connector portion of the utility paths are disposed under at least one load lock chamber consistently of the connecting portion between the transfer box and the vacuum transfer chamber" (emphasis added). The Examiner contends

that Bernard et al teach providing connector portion of utility paths under a floor referring to Fig. 4 and member 35 of a building. However, it is apparent that Bernard et al does not disclose or teach the structural arrangement as claimed, which overcomes, the disadvantages of the prior art as described at page 16 of the specification.

CONCLUSION

For the foregoing reasons, appellants request that the Examiner's rejections be reversed.

The Appeal Brief fee is submitted herewith.

Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, Deposit Account No. 01-2135 (Case: 648.43120CC2), and please credit any excess fees to said deposit account.

Respectfully submitted,

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APPENDIX A

12. A vacuum processing apparatus comprising:

a transfer box inside of which an object wafer to be processed is transferred under an atmospheric condition by a transfer robot disposed therein, the transfer box having a plurality of wafer cassettes installed at a front surface portion thereof;

a vacuum transfer chamber disposed at a rear surface portion of the transfer box and detachably connected thereto, the vacuum transfer chamber enabling transfer of the object wafer therein under a vacuum condition;

at least one vacuum processing chamber disposed at a rear or side of the vacuum transfer chamber and being connected thereto, the at least one vacuum processing chamber being supplied with gas and enabling processing of the object wafer transferred under the vacuum condition by a plasma generated therein; and

a plurality of connector portions of utility paths being disposed substantially linearly under a connecting portion of the transfer box and the vacuum transfer chamber, and being disposed at the rear surface portion of the transfer box;

wherein the utility paths enable supply of utilities including the gas supplied from a building having the vacuum processing apparatus installed therein to the vacuum transfer chamber or the vacuum processing chamber and enables discharge of exhaust from the vacuum transfer chamber or the vacuum processing chamber including the utilities supplied thereto.

13. A vacuum processing apparatus comprising:

an atmospheric block including a transfer box inside of which an object wafer to be processed is transferred under an atmospheric condition by a transfer robot disposed therein, the transfer box having a plurality of wafer cassettes installed at a front surface portion thereof;

a vacuum transfer chamber disposed at a rear surface portion of the transfer box and detachably connected thereto, the vacuum transfer chamber enabling transfer of the object wafer therein under a vacuum condition;

a vacuum processing block, installed at a connecting portion of the vacuum transfer chamber and the transfer box;

at least one vacuum processing chamber of the vacuum processing block being disposed at a rear or side of the vacuum transfer chamber and being connected thereto, the at least one vacuum processing transfer being supplied with gas and enabling processing of the object wafer transferred under the vacuum condition by a plasma generated therein; and

a plurality of connector portions of utility paths being disposed substantially linearly under a connecting portion of the transfer box and the vacuum transfer chamber, and being disposed at the rear surface portion of the transfer box;

wherein the utility paths enables supply of utilities including the gas supplied from a building having the vacuum processing apparatus installed therein to the vacuum transfer chamber or the vacuum processing chamber and enable discharge of exhaust from the vacuum transfer chamber or the vacuum

processing chamber including the utilities supplied thereto.

14. The vacuum processing apparatus according to claim 12, wherein the utilities include plural kinds of gases, water, air supplied from the building.

15. The vacuum processing apparatus according to claim 14, wherein the connector portions of the utility paths connect with paths arranged under a floor of the building in which the vacuum processing apparatus is installed.

16. The vacuum processing apparatus according to claim 15, wherein the connector portions of the utility paths are disposed under at least one load lock chamber consisting of the connecting portion between the transfer box and the vacuum transfer chamber.

17. The vacuum processing apparatus according to claim 14, wherein the connector portions of the utility paths are disposed under at least one load lock chamber consisting of the connection portion between the transfer box and the vacuum transfer chamber.

18. The vacuum processing apparatus according to claim 14, further comprising display units disposed at the rear surface portion of the transfer box and enable display of a status of the utility.

19. The vacuum processing apparatus according to claim 13, wherein the utilities include plural kinds of gases, water, air supplied arranged the building.

20. The vacuum processing apparatus according to claim 19, wherein the connector portions of the utility paths connect with paths from under a floor of the building in which the vacuum processing apparatus is installed.

21. The vacuum processing apparatus according to claim 20, wherein the

connector portions of the utility paths are disposed under at least one load lock chamber consisting of the connecting portion between the transfer box and the vacuum transfer chamber.

22. The vacuum processing apparatus according to claim 19, wherein the connector portions of the utility paths are disposed under at least one load lock chamber consisting of the connection portion between the transfer box and the vacuum transfer chamber.

23. The vacuum processing apparatus according to claim 13, further comprising display units disposed at the rear surface portion of the transfer box and enable display of a status of the utility.